



WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # _____

PDF # _____ PERMIT WRITER: _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):

PVS Technologies, Inc.

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):

Natrium Plant

3. NORTH AMERICAN INDUSTRY
CLASSIFICATION SYSTEM (NAICS)
CODE:

325188

4A. MAILING ADDRESS:

PVS Technologies, Inc.
10900 Harper Ave.
Detroit, MI 48213

4B. PHYSICAL ADDRESS:

PVS Technologies, Inc.
State Route 2
New Martinsville, WV 26155

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A): **Directions to PVS Technologies Natrium Facility From Wheeling, WV:** Take I-70 West to WV State Route 2 South, Follow State Rt 2 South for 36 miles & at the light make left into Axiall Westlake main guard office
From New Martinsville, WV: Follow WV State Route 2 North for 6 Miles & at light make a right into Axiall Westlake main guard office

5B. NEAREST ROAD:

State Route 2

5C. NEAREST CITY OR TOWN:

Natrium

5D. COUNTY:

Marshall

5E. UTM NORTHING (KM):

4,400.11

5F. UTM EASTING (KM):

512.53

5G. UTM ZONE:

17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:

Shane Brunson

6B. TITLE:

Director of Manufacturing

6C. TELEPHONE:

(909) 648-1362

6D. FAX:

(713) 3303003

6E. E-MAIL:

sbrunson@pvschemicals.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):

051 - 00140

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19
AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED
WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):

R13-2883

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST: **NO**

8A. TYPE OF EMISSION SOURCE (CHECK ONE):

☒ NEW SOURCE

☐ ADMINISTRATIVE UPDATE

☐ MODIFICATION

☐ OTHER (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE
APPLICANT'S CONSENT TO UPDATE THE EXISTING
PERMIT WITH THE INFORMATION CONTAINED HEREIN?

☐ YES

☐ NO

9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED?

☐ YES

☒ NO

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:

May/ 22 /2017.

10B. DATE OF ANTICIPATED START-UP:

June/ 5 /2017.

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.

12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.



13A. REGULATED AIR POLLUTANT EMISSIONS:

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM		
PM ₁₀		
VOCs		
CO		
NO _x		
SO ₂		
Pb		
HAPs (AGGREGATE AMOUNT)	Maximum Hourly Rate 0.00224 lbs./hr. HCL	0.0098 ton/yr.
TAPs (INDIVIDUALLY)*		
OTHER (INDIVIDUALLY)*		

* ATTACH ADDITIONAL PAGES AS NEEDED

13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. CERTIFICATION OF DATA

I, Shane Brunson (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**** (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: Shane Brunson

TITLE: Director of Manufacturing

DATE: 4 / 17 / 2017

** THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:

☒ ATTACHMENT A ☒ ATTACHMENT B ☒ ATTACHMENT C ☒ ATTACHMENT D ☒ ATTACHMENT E

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

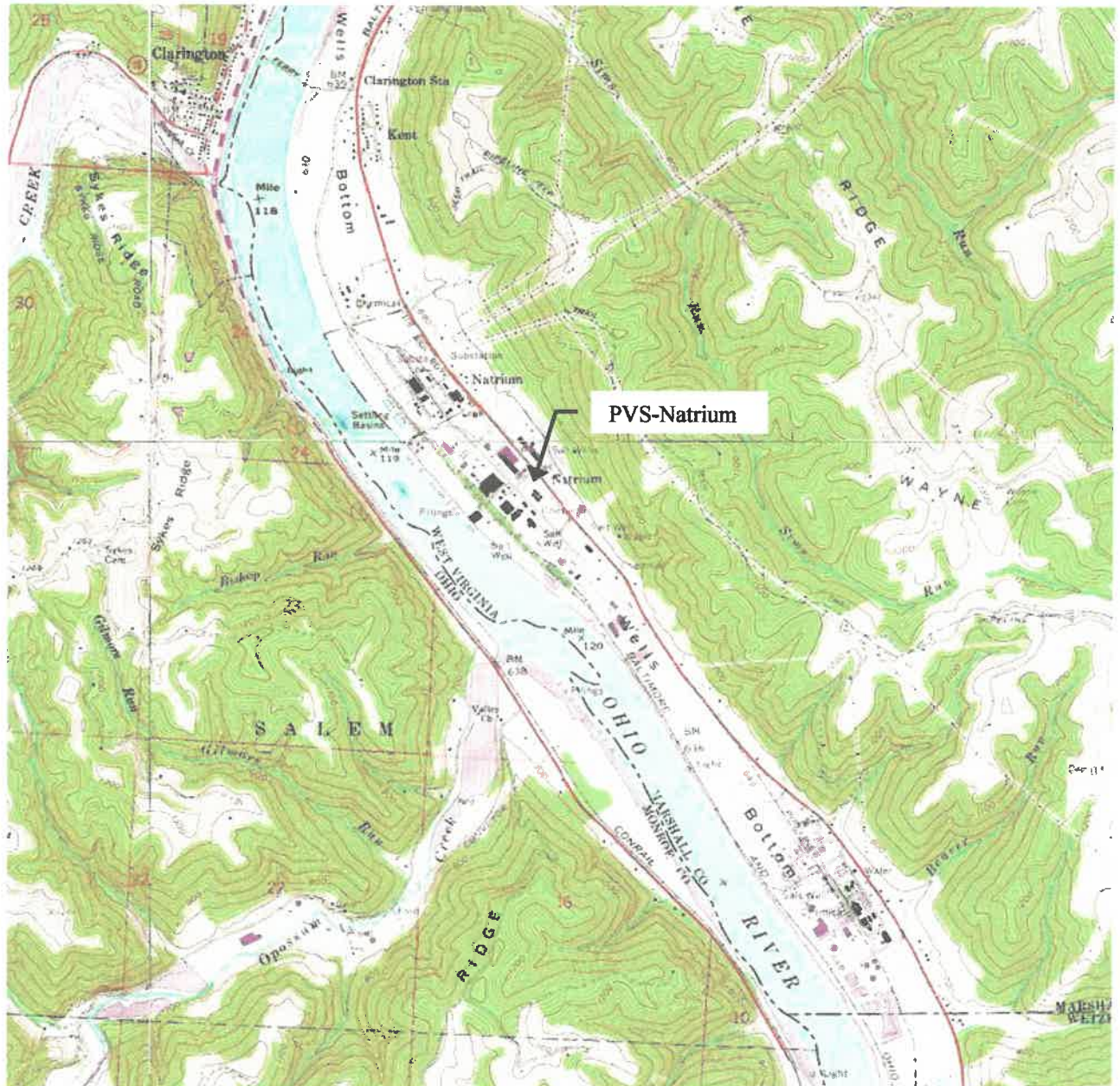
www.dep.wv.gov/daq



ATTACHMENT A – SITE LOCATION MAP**PVS Technologies, Inc.
New Martinsville/Natrium, West Virginia**

USGS Map Name: New Martinsville, WV Map MRC: 39080F7

UTM Zone: 17N Datum: NAD27 Zoom: 8m/pixel



ATTACHMENT B – PROCESS FLOW DIAGRAM

The proposed changes are shown in red on the Process Flow Diagram below. The Ferrous Chloride Storage Tank, T-120, would be the new emission point.

T-120
FERROUS CHLORIDE
STORAGE TANK
6,000 GAL

A-101/A-102
REACTOR AGITATOR

CR-101
BUILDING CRANE

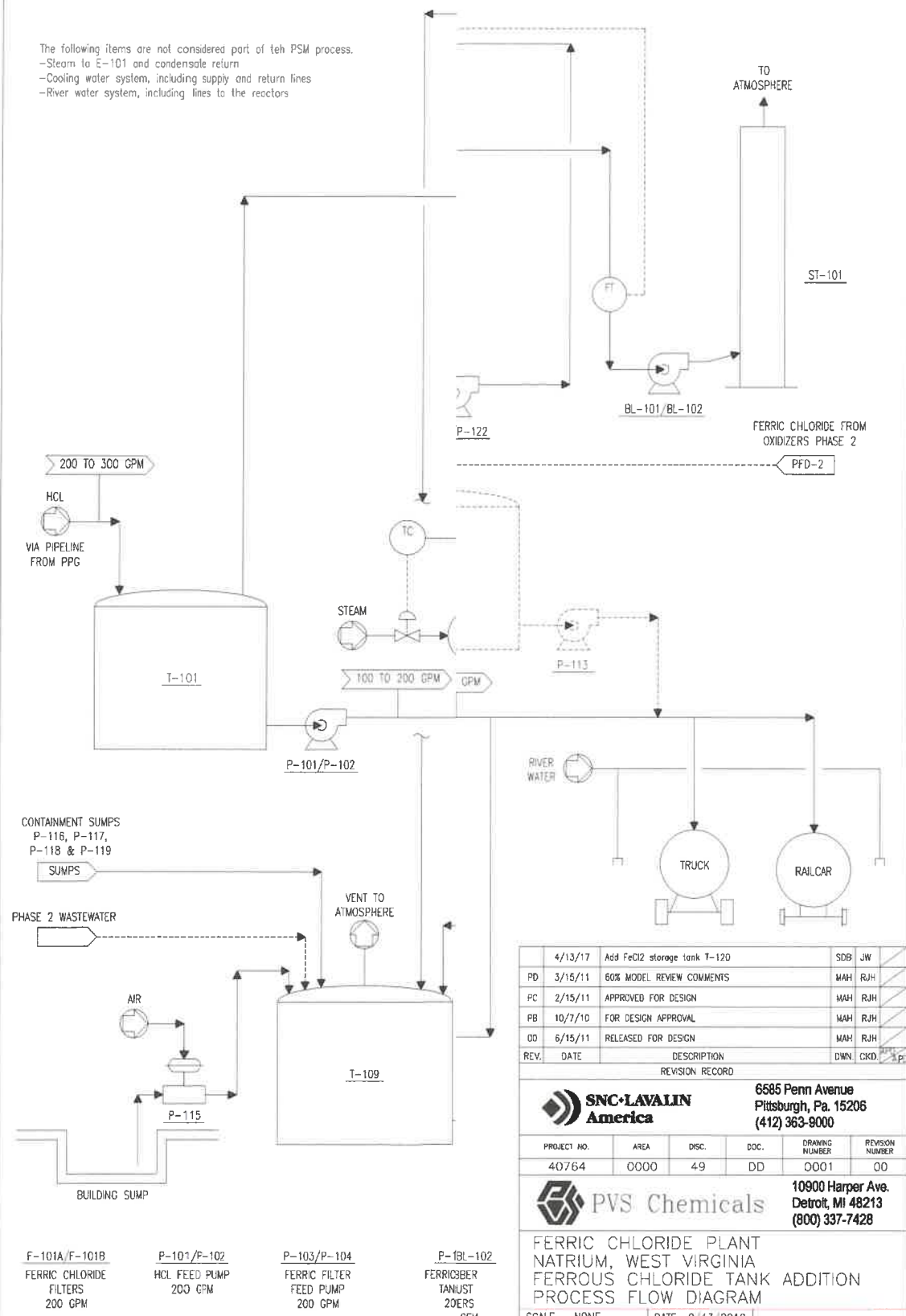
E-101
HCL FEED HEATER

ST-101
STACK
12' DIA

K-101
TRAY SCRUBBER
36" DIA
5 TRAYS

K-102
PACKED BED
SCRUBBER
48" DIA

The following items are not considered part of the PSM process.
-Steam to E-101 and condensate return
-Cooling water system, including supply and return lines
-River water system, including lines to the reactors



CONTAINMENT SUMPS
P-116, P-117,
P-118 & P-119

PHASE 2 WASTEWATER

AIR

P-115

BUILDING SUMP

F-101A/F-101B
FERRIC CHLORIDE
FILTERS
200 GPM

P-101/P-102
HCL FEED PUMP
200 GPM

P-103/P-104
FERRIC FILTER
FEED PUMP
200 GPM

P-101-102
FERRIC CHLORIDE
TANKS
200 GPM

REV.	DATE	DESCRIPTION	DWN	CHKD	APPD
4/13/17		Add FeCl2 storage tank T-120	SOB	JW	
PD	3/15/11	60% MODEL REVIEW COMMENTS	MAH	RJH	
PC	2/15/11	APPROVED FOR DESIGN	MAH	RJH	
FB	10/7/10	FOR DESIGN APPROVAL	MAH	RJH	
OD	6/15/11	RELEASED FOR DESIGN	MAH	RJH	

REVISION RECORD

SNC-LAVALIN America

6585 Penn Avenue
Pittsburgh, Pa. 15206
(412) 363-8000

PROJECT NO.	AREA	DISC.	DOC.	DRAWING NUMBER	REVISION NUMBER
40764	0000	49	DD	0001	00

PVS Chemicals

10900 Harper Ave.
Detroit, MI 48213
(800) 337-7428

FERRIC CHLORIDE PLANT
NATRIUM, WEST VIRGINIA
FERROUS CHLORIDE TANK ADDITION
PROCESS FLOW DIAGRAM

SCALE	NONE	DATE	9/13/2010	REVISION	
DRAWN BY	MJH	DRAWING NUMBER			
CHECKED	RCH				
APPROVED	A. YAKSIC				

PFD-1 +FeCl2 Tk 00

Attachment C

Process Description

PVS Technologies, Inc. (PVS), a subsidiary of PVS Chemicals, Inc., operates an inorganic chemicals manufacturing plant located in Natrium, WV (Marshall County). The plant site is located on a plot within the existing Axiall Corp. chemical manufacturing plant site.

Our process to make ferric chloride uses hydrochloric acid (HCl) and iron oxide as raw materials. The Hydrochloric acid is supplied via pipeline from Axiall to our storage tank. The HCl will be pumped through a heat exchanger and heated if necessary to max temp of 100F to one of 2 mixing reactors. Once the HCl has reached a level of about 5' the mixer will be started. Iron oxide which is shipped and stored in supersacks will be lifted with an overhead crane and added to the mixing tank. The iron oxide will immediately begin to react with the HCl to make ferric chloride $\text{Fe}_2\text{O}_3 + 6\text{HCl} \rightarrow 2\text{FeCl}_3 + 3\text{H}_2\text{O}$. Each batch will use approximately 10,000 gallons HCl and 25,000-25,400 lbs of iron oxide. Once the tank is filled with HCl and iron oxide the reactor will be allowed to mix for 4 hours until the reaction is complete. The HCl, iron oxide, ferric solution can be recirculated through a heat exchanger to add additional heat until the batch reaches 190F to help push the reaction to completion if necessary. Once the reaction is complete, which is verified by testing the ferric chloride and HCl concentration, the mixer will be turned off and the solution allowed to settle any undissolved iron oxide for a minimum of 3 hours. The ferric chloride will be decanted out of the reactor and pumped through a filter to one of two storage tanks. The undissolved iron oxide that remains in the reactor is used in the next production batch. If an operator adds too much iron oxide then there will be more iron oxide left in the reactor when the batch is finished and the operator doesn't need to add as much iron oxide to the next batch.

More iron oxide is added than is stoichiometrically needed in order to push the reaction to completion.

HCl fumes from the HCl storage tank and the reactors will be scrubbed through a water scrubber.

We add about 20-30 gallons of ferrous chloride to each batch of ferric chloride produced. At present this ferrous chloride is handled via tote. We are proposing to install a storage tank for the ferrous chloride to eliminate the use of totes.

ATTACHMENT D – SAFETY DATA SHEETS

1. Ferrous Chloride Solution
2. Muriatic Acid (Hydrochloric Acid)



Revision Date Apr-04-2017

Safety Data Sheet

Item #10248/11055

Safety Data Sheet 3743

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Ferrous Chloride Solution
UN/ID No. UN1760
Synonyms Iron (II) Chloride
Recommended Use Water treatment chemical, Industrial wastewater treatment, Municipal wastewater treatment, Chrome reduction
Uses advised against Consumer uses: Private households (= general public = consumers).

Company Name
PVS Technologies, Inc.
10900 Harper Ave.
Detroit, MI 48213
(313) 571-1100
24 Hour Emergency Phone Number CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

Acute toxicity - Oral	Category 4
Acute toxicity - Inhalation (Gases)	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
May be corrosive to metals	Category 1

Emergency Overview

DANGER

Hazard statements
Physical hazards

Causes severe skin burns and eye damage
Do not handle until all hazard precautions have been read and understood



Precautionary statements

Prevention

Response

Storage

Disposal

- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product
- Use only outdoors or in a well-ventilated area
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wear protective gloves/protective clothing/eye protection/face protection
- Immediately call a POISON CENTER or doctor/physician
- Specific treatment (see section 4 on this Safety Data Sheet)
- Store locked up
- Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None known.

Other Information

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity

Ferrous Chloride Solution**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS No.	EC No.	Weight-% *
Ferrous chloride	7758-94-3	231-843-4	16-30
Hydrogen chloride	7647-01-0	231-595-7	0-6

4. FIRST AID MEASURES

General advice	Call 911 or emergency medical service Remove and isolate contaminated clothing and shoes
Eye contact	<ul style="list-style-type: none">• In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes
Skin Contact	<ul style="list-style-type: none">• For minor skin contact, avoid spreading material on unaffected skin
-Inhalation	<ul style="list-style-type: none">• Move victim to fresh air• If breathing is irregular or stopped, administer artificial respiration• Administer oxygen if breathing is difficult
Ingestion	<ul style="list-style-type: none">• Immediate medical attention is required• Do NOT induce vomiting• Rinse mouth• Drink 4 to 8 ounces (120-240 ml) of water or milk as soon as possible after ingestion.• Never give anything by mouth to an unconscious person• Call a physician or poison control center immediately
Note to physician	<ul style="list-style-type: none">• Keep victim warm and quiet• Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed
Self-protection for first aid personnel	<ul style="list-style-type: none">• Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves• Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	<ul style="list-style-type: none">• Dry chemical, CO2, alcohol-resistant foam or water spray• Dry chemical, CO2 or water spray• Move containers from fire area if you can do it without risk• Dike fire control water for later disposal; do not scatter the material
Unsuitable extinguishing media	<ul style="list-style-type: none">• No information available
Specific hazards arising from the chemical	<ul style="list-style-type: none">• Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.)
Protective equipment and precautions for firefighters	<ul style="list-style-type: none">• Wear a self-contained breathing apparatus and chemical protective clothing
Flammable properties	<ul style="list-style-type: none">• Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes• Contact with metals may evolve flammable hydrogen gas• Containers may explode when heated
Explosive properties	<ul style="list-style-type: none">• No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	<ul style="list-style-type: none">• ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area)• Do not touch damaged containers or spilled material unless wearing appropriate protective clothing
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Ferrous Chloride Solution

Environmental precautions

- Stop leak if you can do it without risk
- For small spills absorb material on dry rags, cat litter or similar absorbent material and dispose of in the trash
- For large spills, contain the material using barriers of absorbent pigs, clay absorbent or earth dams.
- US regulations require reporting spills of this material that could reach any surface waters. The toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802

Methods for cleaning up

- Dike far ahead of liquid spill for later disposal
- Neutralize with soda ash or lime
- Soak up with inert absorbent material
- Take up mechanically, placing in appropriate containers for disposal
- Clean contaminated surface thoroughly
- Prevent product from entering drains
- Do not get water inside containers or in contact with substance

Other Information

7. HANDLING AND STORAGE

Advice on safe handling

- Use personal protective equipment as required
- Avoid contact with skin, eyes or clothing
- Ensure adequate ventilation, especially in confined areas
- In case of insufficient ventilation, wear suitable respiratory equipment
- Use only with adequate ventilation and in closed systems

Storage Conditions

- Keep container tightly closed in a dry and well-ventilated place
- Keep out of the reach of children
- Keep containers tightly closed in a dry, cool and well-ventilated place
- Keep in properly labeled containers

Incompatible materials

Contact with metals may evolve flammable hydrogen gas, Oxidizers, Strong bases, Reducing agents, Alcohols, Sulfides, Styrene, Incompatible with strong acids and bases, Incompatible with oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Ferrous chloride 7758-94-3	TWA: 1 mg/m ³ Fe		TWA: 1 mg/m ³ Fe
Hydrogen chloride 7647-01-0	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m ³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m ³

Exposure Guidelines

Engineering Controls

Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection

- A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.

Eye/Face protection

- Tight sealing safety goggles
- Face protection shield

Skin and body protection

- Wear suitable protective clothing
- Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact

General Hygiene Considerations

- When using do not eat, drink or smoke
- Wash contaminated clothing before reuse
- Keep away from food, drink and animal feeding stuffs
- Contaminated work clothing should not be allowed out of the workplace
- Regular cleaning of equipment, work area and clothing is recommended
- Avoid contact with skin, eyes or clothing

Ferrous Chloride Solution

- Take off all contaminated clothing and wash it before reuse
- Wear suitable gloves and eye/face protection

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	aqueous solution
Color	green to yellow
Odor	Iron Slight acidic
Odor threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	<2.0	
Melting point/Freezing Point	-50 °C / -58 °F	solution (20 %)
Boiling point / boiling range	> 100 °C / 212 °F	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific Gravity	1.20	20% Solution @17.5°C
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	
<u>Other Information</u>		
Softening point °C	No information available	
Molecular weight	No information available	
VOC Content (%)	No information available	
Density	No information available	
Bulk density	10.00 Pounds per gallon (lb/gal)	

10. STABILITY AND REACTIVITY

Stability	<ul style="list-style-type: none">• Stable under recommended storage conditions
Conditions to avoid	<ul style="list-style-type: none">• Elevated temperature• Exposure to air or moisture over prolonged periods
Incompatible materials	<ul style="list-style-type: none">• Contact with metals may evolve flammable hydrogen gas• Oxidizers• Strong bases• Reducing agents• Alcohols• Sulfides• Styrene• Incompatible with strong acids and bases• Incompatible with oxidizing agents

Hazardous Decomposition Products • Thermal decomposition can lead to release of irritating and toxic gases and vapors

Possibility of Hazardous Reactions • None under normal processing and storage

Ferrous Chloride Solution

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principle Routes of Exposure	-Inhalation, Skin Contact, Eye contact
-Inhalation	May cause irritation of respiratory tract. Avoid breathing vapors or mists.
Ingestion	May be harmful if swallowed.
Skin Contact	May cause skin irritation and/or dermatitis.
Eye contact	Contact with eyes may cause irritation.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Ferrous chloride 7758-94-3	450 mg/kg (Rat)		
Hydrogen chloride 7647-01-0	238 - 277 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	= 1.68 mg/L (Rat) 1 h

Information on toxicological effects

Symptoms	No information available
Delayed and immediate effects as well as chronic effects from short and long-term exposure	

Sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen. This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Hydrogen chloride 7647-01-0		Group 3		X

*IARC (International Agency for Research on Cancer)
Not classifiable as a human carcinogen*

Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Chronic toxicity	Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects. May cause adverse liver effects.
Target Organ Effects	Eyes, Gastrointestinal tract (GI), Liver, Respiratory system, Skin.
Aspiration hazard	No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document . mg/kg mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity

26% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Persistence and degradability	No information available.
Bioaccumulation	No information available

Other adverse effects	No information available
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13. DISPOSAL CONSIDERATIONS

Disposal of wastes	<ul style="list-style-type: none">• Dispose of in accordance with federal, state and local regulations• Dispose of hazardous waste in a RCRA licensed facility
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Ferrous Chloride Solution
Contaminated packaging
US EPA Waste Number

- Do not reuse container
- D002

14. TRANSPORT INFORMATION

DOT

Proper shipping name CORROSIVE LIQUID, N.O.S.
Hazard Class 8
UN/ID No. UN1760
Packing Group II
RQ (lbs)(dry) Ferrous chloride: RQ kg= 45.40
Description UN1760, Corrosive liquid, n.o.s. (FERROUS CHLORIDE, HYDROCHLORIC ACID), 8, II, RQ
Special Provisions B2, IB2, TII, TP2, TP27
Emergency Response Guide Number 154

Transport Canada

UN/ID No. UN1760
Proper shipping name CORROSIVE LIQUID, N.O.S.
Hazard Class 8
Packing Group II
Description UN1760, Corrosive liquid, n.o.s. (FERROUS CHLORIDE, HYDROCHLORIC ACID), 8, II

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312 Hazard Categories

Acute health hazard Yes
Chronic Health Hazard Yes
Fire hazard No
Sudden release of pressure hazard No
Reactive Hazard No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	SARA 313 - Threshold Values %
Hydrogen chloride - 7647-01-0	1.0

U.S. - TSCA (Toxic Substances Control Act) - Section 5(a)(2) - Chemicals with Significant New Use Rules (SNURs)

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Ferrous chloride 7758-94-3	100 lb			X
Hydrogen chloride 7647-01-0	5000 lb			X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ (lbs)(dry)
Ferrous chloride 7758-94-3	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ
Hydrogen chloride 7647-01-0	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ

Canada

Ferrous Chloride Solution

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Classification

Non-controlled

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Water 7732-18-5			X
Ferrous chloride 7758-94-3	X	X	X
Hydrogen chloride 7647-01-0	X	X	X

DEA List I, List II

Chemical Name	U.S. - DEA - List I or Precursor Chemicals	U.S.- DEA - List II or Essential Chemicals
Hydrogen chloride 7647-01-0	-	50 gallon, Export Volume 27 kg, Export Weight 0.0 kg, Domestic Sales Weight

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

NFPA

Health hazards 3

Flammability 0

Instability 0

Physical and Chemical
Properties

HMIS

Health hazards 3

Flammability 0

Physical hazards 0

Personal protection D

Item

10248/11055

Safety Data Sheet

3743

Revision Date

Apr-04-2017

Issue Date

Apr-04-2017

Version

1

Revision Note

*** Updated value on SDS.

Disclaimer

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Ferrous Chloride Solution

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End of Safety Data Sheet



Safety Data Sheet

Section 1: Identification

Product identifier

- Product Name** • **Muriatic Acid (7-23 deg. Baume/15-38%)**
- Synonyms** • HCl; Hydrochloric Acid; Hydrogen Chloride; Muriatic Acid

Relevant identified uses of the substance or mixture and uses advised against

- Recommended use** • Industrial applications

Details of the supplier of the safety data sheet

- Manufacturer** • Axiall, LLC
1000 Abernathy Rd. NE, Suite 1200
Atlanta, GA 30328
United States
www.axiall.com
msdsinfo@axiall.com

Telephone (General) • +1 225-685-1240

- Supplier** • Axiall Canada, Inc.
31, rue de L'Industrie
Beauharnois J6N 1W5
Canada

Telephone (General) • 450-429-4641

Telephone (General) • 450-429-3326 - FAX

Emergency telephone number

- Manufacturer** • +1 304-455-6882

Section 2: Hazard Identification

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

- OSHA HCS 2012** • Corrosive to Metals 1
Acute Toxicity Oral 4
Skin Corrosion 1B
Serious Eye Damage 1
Acute Toxicity Inhalation 4
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation

Label elements

OSHA HCS 2012

DANGER



- Hazard statements** • May be corrosive to metals
Harmful if swallowed
Causes severe skin burns and eye damage.
Causes serious eye damage
Harmful if inhaled
May cause respiratory irritation

Precautionary statements

- Prevention** • Keep only in original container.
Do not breathe mist/vapours/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
- Response** • Absorb spillage to prevent material damage.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
Specific treatment, see supplemental first aid information.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.
Do NOT induce vomiting.
- Storage/Disposal** • Store in corrosive resistant container with a resistant inner liner.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS 2015

Classification of the substance or mixture

WHMIS 2015

- Corrosive to Metals 1
Acute Toxicity Oral 4
Skin Corrosion 1B
Serious Eye Damage 1
Acute Toxicity Inhalation 4
Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation

Label elements

WHMIS 2015

DANGER



- Hazard statements** • May be corrosive to metals
Harmful if swallowed
Causes severe skin burns and eye damage.
Causes serious eye damage
Harmful if inhaled
May cause respiratory irritation

Precautionary statements

- Prevention** • Keep only in original packaging.
Do not breathe mist, vapours and/or spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
- Response** • Absorb spillage to prevent material damage.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
Specific treatment, see supplemental first aid information.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER/doctor.
IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
Rinse mouth.
Do NOT induce vomiting.
- Storage/Disposal** • Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Store in corrosive resistant container with a resistant inner liner.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Other hazards

WHMIS 2015

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

Composition				
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive
Hydrochloric acid	CAS:7647-01-0	15% TO 40%	Inhalation-Rat LC50 • 3124 ppm 1 Hour(s)	OSHA HCS 2012: Skin Corr. 1B; Eye Dam. 1; Acute Tox. 4 (oral, inh); STOT SE 3 Resp. Irrit.; Corr. to Metals WHMIS 2015: Skin Corr. 1B; Eye Dam. 1; Acute Tox. 4 (oral, inh); STOT SE 3 Resp. Irrit.; Corr. to Metals

Mixtures

- Material does not meet the criteria of a mixture.

Section 4: First-Aid Measures

Description of first aid measures

Inhalation

- Move victim to fresh air. Administer oxygen if breathing is difficult. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give artificial respiration if victim is not breathing. Get medical attention immediately.

Skin

- For minor skin contact, avoid spreading material on unaffected skin. Remove and isolate contaminated clothing. Wash the contaminated area of body with soap and fresh water. Get medical attention immediately.

Eye

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Get medical attention immediately.

Ingestion

- If swallowed, rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Do not use mouth-to-mouth method if victim ingested the substance. Obtain medical attention immediately if ingested.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media • Use dry chemical, CO2, water spray (fog), or foam.

Unsuitable Extinguishing Media • No data available

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards • Containers may explode when heated. Emits toxic fumes under fire conditions.

Hazardous Combustion Products • Depending on conditions, decomposition products may include the following materials: halogenated compounds, may release dangerous gases (chlorine).

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
Move containers from fire area if you can do it without risk.
LARGE FIRES: Cool containers with flooding quantities of water until well after fire is out.
Dike fire control water for later disposal; do not scatter the material.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Ventilate enclosed areas. Do not walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear

- Emergency Procedures**
- appropriate personal protective equipment, avoid direct contact. Do not breathe mist, vapors, spray. Do not get in eyes, on skin, or on clothing.
 - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Do not get water inside container.

Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

- Containment/Clean-up Measures**
- Stop leak if you can do it without risk. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
 - LARGE SPILLS: Dike far ahead of spill for later disposal.

Section 7 - Handling and Storage

Precautions for safe handling

- Handling**
- Handle and open container with care. Use only with adequate ventilation. Keep away from heat. Use caution when combining with water; DO NOT add water to corrosive liquid, ALWAYS add corrosive liquid to water while stirring to prevent release of heat, steam and fumes. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe mist, vapors, spray. Do not get in eyes, on skin, or on clothing. Do not ingest. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Conditions for safe storage, including any incompatibilities

- Storage**
- Keep container tightly closed. Store in a cool, dry, well-ventilated place. Keep away from incompatible materials. Keep from direct sunlight. Separate from alkalis. Do not store above the following temperature: 49°C/120°F. FOR BULK STORAGE CONTAINERS: Bulk storage tanks should be constructed of corrosion-resistant materials such as rubber- or glass-lined steel, fiberglass, or plastic and should be vented to a scrubber to remove acid fumes. Bulk storage tanks should contain a dike sufficiently large enough to contain entire contents.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines						
	Result	ACGIH	Canada British Columbia	Canada Ontario	Canada Quebec	NIOSH
Hydrochloric acid (7647-01-0)	Ceilings	2 ppm Ceiling	2 ppm Ceiling	2 ppm Ceiling	5 ppm Ceiling; 7.5 mg/m ³ Ceiling	5 ppm Ceiling; 7 mg/m ³ Ceiling
Exposure Limits/Guidelines (Con't.)						
	Result	OSHA				
Hydrochloric acid (7647-01-0)	Ceilings	5 ppm Ceiling; 7 mg/m ³ Ceiling				

Exposure controls

- Engineering Measures/Controls**
- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

- Respiratory**
- If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Eye/Face**
- Wear chemical splash goggles and face shield.
- Skin/Body**
- Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. HANDS: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- General Industrial Hygiene Considerations**
- Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Environmental Exposure Controls**
- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Liquid	Appearance/Description	Colorless to a light yellow liquid with a pungent odor.
Color	Colorless to light yellow.	Odor	Pungent
Odor Threshold	No data available		
General Properties			
Boiling Point	108 °C(226.4 °F) (Azeotrope @ 20.2%)	Melting Point/Freezing Point	No data available
Decomposition Temperature	No data available	pH	1 [Conc. (% w/w) 0.36%]
Specific Gravity/Relative Density	1.051 to 1.189 Water=1	Water Solubility	100 %
Viscosity	No data available		
Volatility			
Vapor Pressure	15 to 150 mmHg (torr) @ 20 °C(68 °F)	Vapor Density	1.267 Air=1
Evaporation Rate	No data available	Volatiles (Wt.)	100 %
Volatiles (Vol.)	100 %		
Flammability			
Flash Point	No data available	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	Not relevant.		

Environmental

Octanol/Water Partition coefficient No data available

Section 10: Stability and Reactivity**Reactivity**

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under recommended storage and handling conditions.

Possibility of hazardous reactions

- Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid

- When exposed to high temperatures may produce hazardous decomposition products. Avoid increased storage temperature. Pressure hazard.

Incompatible materials

- Attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air. Reactive or incompatible with the following materials: alkalis.

Hazardous decomposition products

- Depending on conditions, decomposition products may include the following materials: halogenated compounds, may release dangerous gases (chlorine).

Section 11 - Toxicological Information**Information on toxicological effects**

	CAS	
Muriatic Acid (7-23 deg. Baume/15-38%)	NDA	Acute Toxicity: Ingestion/Oral-Rat LD50 • 700 mg/kg; Inhalation-Rat LC50 • 3124 ppm; Skin-Rabbit LD50 • >5010 mg/kg
Components		
Hydrochloric acid (15% TO 40%)	7647-01-0	Reproductive: Inhalation-Rat TCLo • 450 mg/m ³ 1 Hour(s)(1D pre); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus); Reproductive Effects:Specific Developmental Abnormalities:Homeostasis</i>

GHS Properties	Classification
Acute toxicity	OSHA HCS 2012 • Acute Toxicity - Inhalation 4; Acute Toxicity - Oral 4 WHMIS 2015 • Acute Toxicity - Inhalation 4; Acute Toxicity - Oral 4
Skin corrosion/Irritation	OSHA HCS 2012 • Skin Corrosion 1B WHMIS 2015 • Skin Corrosion 1B
Serious eye damage/Irritation	OSHA HCS 2012 • Serious Eye Damage 1 WHMIS 2015 • Serious Eye Damage 1
Skin sensitization	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Respiratory sensitization	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking

Aspiration Hazard	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Carcinogenicity	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Germ Cell Mutagenicity	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
Toxicity for Reproduction	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking
STOT-SE	OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation WHMIS 2015 • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
STOT-RE	OSHA HCS 2012 • Data lacking WHMIS 2015 • Data lacking

Potential Health Effects

Inhalation

Acute (Immediate)

- May cause respiratory irritation.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.

Skin

Acute (Immediate)

- Causes severe skin burns.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials will cause dermatitis.

Eye

Acute (Immediate)

- Causes serious eye damage.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials or fumes may cause conjunctivitis.

Ingestion

Acute (Immediate)

- Harmful if swallowed. May cause irreversible damage to mucous membranes.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal disturbances.

Carcinogenic Effects

- This material does contain a component that may cause cancer, however based on regulatory criteria this material is not classified as a carcinogen.

Carcinogenic Effects			
	CAS	IARC	NTP
Arsenic	7440-38-2	Group 1-Carcinogenic	Known Human Carcinogen
Lead	7439-92-1	Group 2A-Probable Carcinogen	Reasonably Anticipated to be Human Carcinogen

Key to abbreviations

LC = Lethal Concentration

LD = Lethal Dose

TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity

- Material data lacking.

Persistence and degradability

- Material data lacking.

Bioaccumulative potential

- Material data lacking.

Mobility in Soil

- Material data lacking.

Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class (es)	Packing group	Environmental hazards
DOT	UN1789	Hydrochloric Acid solution	8	II	NDA
TDG	UN1789	HYDROCHLORIC ACID solution	8	II	NDA
IMO/IMDG	UN1789	HYDROCHLORIC ACID solution	8	II	NDA
IATA/ICAO	UN1789	Hydrochloric Acid solution	8	II	NDA

Special precautions for user • None specified.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • No data available

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Hydrochloric acid	7647-01-0	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

- Hydrochloric acid

7647-01-0

A, D1A, E (listed under Hydrogen chloride); D1A, E; E (0.036% in aqueous solution, 0.36% in aqueous solution, 3.6% in aqueous solution); D1B, E (28% in aqueous

solution); D1A, E (31.45% in aqueous solution, 35.2% in aqueous solution)

Canada - WHMIS - Ingredient Disclosure List

• Hydrochloric acid	7647-01-0	1 %
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Environment

Canada - CEPA - Priority Substances List

• Hydrochloric acid	7647-01-0	Not Listed
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United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Hydrochloric acid	7647-01-0	5000 lb TQ; 5000 lb TQ (anhydrous)
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U.S. - OSHA - Specifically Regulated Chemicals

• Hydrochloric acid	7647-01-0	Not Listed
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Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Hydrochloric acid	7647-01-0	
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U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Hydrochloric acid	7647-01-0	5000 lb final RQ; 2270 kg final RQ
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U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Hydrochloric acid	7647-01-0	Not Listed
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U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Hydrochloric acid	7647-01-0	5000 lb EPCRA RQ (gas only)
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U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Hydrochloric acid	7647-01-0	500 lb TPQ (gas only)
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U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Hydrochloric acid	7647-01-0	1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)
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U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Hydrochloric acid	7647-01-0	Not Listed
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U.S. - TSCA (Toxic Substances Control Act) - Section 12(b) - Export Notification

• Hydrochloric acid	7647-01-0	Not Listed
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United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Hydrochloric acid	7647-01-0	Not Listed
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U.S. - California - Proposition 65 - Developmental Toxicity

• Hydrochloric acid	7647-01-0	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
• Hydrochloric acid	7647-01-0	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
• Hydrochloric acid	7647-01-0	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
• Hydrochloric acid	7647-01-0	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
• Hydrochloric acid	7647-01-0	Not Listed

Other Information

- **WARNING:** This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

Section 16 - Other Information

Revision Date	• 07/February/2017
Preparation Date	• 01/May/2014
Other Information	• NSF Drinking Water Treatment Chemicals Listing - hydrochloric acid from Lake Charles, Louisiana; New Martinsville, West Virginia; Longview, Washington; or Beauharnois, Quebec, Canada, is certified for maximum use at 40 mg/l under NSF/ANSI Standard 60.
Disclaimer/Statement of Liability	• The technical data given herein is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. No guarantee is being given as to the end use performance. The product is sold on the basis that buyers test the product for their specific purposes. This information related to the material designated and may not be valid for such material used in combination with any other materials or in any process.

Key to abbreviations

NDA = No Data Available

ATTACHMENT E – SUPPORTING CALCULATIONS

The supporting calculations for the proposed ferrous chloride storage tank can be found below in standard black text. . Calculations from the original permit application for the site are included for reference but in light grey text.

Storage Tanks and Loading Racks Emission Calculation

T106 and T107 Ferric Chloride storage tanks:

For the ferric chloride tanks (42% ferric chloride, 0.5% HCl, 57.5% water at max temperature of 200 F):

There's no data describing vapor / liquid equilibria behavior of a ferric chloride / HCl / water mixture (at least none in the range of concentrations we're dealing with), so we used the following line of reasoning:

The vapor pressure for ferric chloride is for the water that the ferric chloride is in solution. Ferric chloride is an iron salt so as the water evaporates the ferric chloride salt remains until there is not enough water left to keep the ferric chloride in solution and the ferric chloride crystallizes into a solid.

Table 3-11 in Perry's (6th ed) states that partial pressure of HCl over a 6% HCl aqueous solution at 95 F is ~0.0038 mm Hg. Atmospheric pressure at Natrium, WV, elevation is ~741 mm Hg. Therefore, assuming ideal vapor:

An MSDS online for a ferric chloride solution that approximates the Natrium product listed the chemical (25 – 45% ferric chloride, 0 – 3% ferrous chloride, 0 – 3% HCl) is manufactured by Gulbrandsen Technologies and has a stated vapor pressure of 40 mm Hg at 95 F. Water at 95 F has a vapor pressure very close to that (42 mm Hg). Therefore, I assumed that the evaporative characteristics of the HCl in the actual Natrium solution could be approximated by that from a simple 0.5% aqueous HCl solution. The data was extrapolated in Table 3-11 to 0.5% HCl using a power regression that fit the low-concentration data fairly well ($R^2 = 0.996$). Then interpolated to the 200 F (93.33 C) max liquid temperature exiting the reactor using an exponential regression fitted to data points at 60, 70, 80, 90, 100, 110 C ($R^2 = 0.998$). The resulting HCl partial pressure was 0.0047 mm Hg. Therefore, again assuming ideal vapor:

$$y_{\text{HCl}} = p_{\text{HCl}} / p_{\text{atm}} = 0.0047 / 741 = 0.00000634$$

$$\text{ppm HCl} = y_{\text{HCl}} * 1,000,000 = 6.3 \text{ (less than the 10 ppm guarantee coming out of the scrubber exhaust)}$$

The plant is planned to produce a maximum of 20,000 dry tons of ferric chloride or about 8,500,000 million gallons.

$$\begin{aligned} 8,500,000 \text{ gal} / 7.48 \text{ gallons/ft}^3 &= 1,136,364 \text{ ft}^3 \text{ displaced air} \\ \text{HCl at 100\% concentration} &= 1,136,364 \text{ ft}^3 * 0.00000634 \\ \text{HCl at 100\% concentration} &= 7.204 \text{ ft}^3 \text{ HCl} \end{aligned}$$

HCl Mass based on 8,500,000 gallon transfer flow over one year
 HCl Mass = $7.204 \text{ ft}^3 * (36.5 \text{ lb HCl} / \text{lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 HCl Mass = 0.732 lbs HCl to air per year. This volume could be spilt between the storages tanks or transferred through just one storage tank.

$$\begin{aligned} \text{ft}^3 \text{ for loading at 300 gpm} &= 300 \text{ gpm} / 7.48 \text{ gal/ft}^3 * 60 \text{ min/hr} \\ &= 2406 \text{ ft}^3/\text{hr} \\ \text{HCl 100\%} &= 2406 * 0.00000634 \end{aligned}$$

$= 0.01525 \text{ ft}^3 \text{ HCl per hr}$
 $\text{HCl Mass} = 0.01525 * (36.5 \text{ lb HCl} / \text{lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.00155 \text{ lbs HCl per hr while transferring}$

For the Ferrous Chloride storage tank (16% - 30% ferrous chloride, 0% - 6% HCl, 64%-84% water, at max temperature of 113 F):

Ferrous chloride is also an iron salt. The same reasoning used in the ferric chloride storage tanks will be used here. The maximum liquid ferrous chloride temperature is 113 F. Table 3-11 in Perry's (6th ed) states that partial pressure of HCl over a 6% HCl aqueous solution at 113 F is ~0.0102 mm Hg. Atmospheric pressure at Natrium, WV, elevation is ~741 mm Hg. Therefore, assuming ideal vapor:

$$y_{\text{HCl}} = p_{\text{HCl}} / p_{\text{atm}} = 0.0102 / 741 = 0.00001376$$

$$\text{ppm HCl} = y_{\text{HCl}} * 1,000,000 = 13.76 \text{ (20.54 mg/m}^3 \text{ at 25}^\circ\text{C and 1 atm)}$$

The plant will consume a maximum of 42,500 gallons of ferrous chloride, 50 gallons per 10,000 gallons of ferric chloride produced.

$42,500 \text{ gal} / 7.48 \text{ gallons/ft}^3 = 5,682 \text{ ft}^3 \text{ displaced air}$
 $\text{HCl at 100\% concentration} = 5,682 \text{ ft}^3 * 0.00001376$
 $\text{HCl at 100\% concentration} = 0.078 \text{ ft}^3 \text{ HCl}$

$\text{HCl Mass based on 42,500 gallon transfer flow over one year}$
 $\text{HCl Mass} = 0.078 \text{ ft}^3 * (36.5 \text{ lb HCl} / \text{lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.0079 \text{ lbs HCl to air per year.}$

$\text{ft}^3 \text{ for loading at 200 gpm} = 200 \text{ gpm} / 7.48 \text{ gal/ft}^3 * 60 \text{ min/hr}$
 $= 1604 \text{ ft}^3/\text{hr}$
 $\text{HCl 100\%} = 1604 * 0.00001376$
 $= 0.02207 \text{ ft}^3 \text{ HCl per hr}$
 $\text{HCl Mass} = 0.02207 * (36.5 \text{ lb HCl} / \text{lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.00224 \text{ lbs HCl per hr while transferring}$

For the scrubber water tank (max 6% aqueous HCl at max temperature of 95 F):

Scrubber liquor temperature 95 F maximum, any scrubber liquor pumped to the storage tank will also have a maximum temperature of 95 F. Table 3-11 in Perry's (6th ed) states that partial pressure of HCl over a 6% HCl aqueous solution at 95 F is ~0.0038 mm Hg. Atmospheric pressure at Natrium, WV, elevation is ~741 mm Hg. Therefore, assuming ideal vapor:

$$y_{\text{HCl}} = p_{\text{HCl}} / p_{\text{atm}} = 0.0038 / 741 = 0.00000513$$

$$\text{ppm HCl} = y_{\text{HCl}} * 1,000,000 = 5.2 \text{ (less than the 10 ppm guarantee coming out of the scrubber exhaust)}$$

$4,000 \text{ gallons per day} * 365 \text{ days per year worst case} = 1,460,000 \text{ gallons per year scrubber solution plus another } 1,000,000 = 2,460,000 \text{ gallons per year}$

$2,460,000 \text{ gal} / 7.48 \text{ gallons/ft}^3 = 328,877 \text{ ft}^3 \text{ displaced air}$
 $\text{HCl at 100\% concentration} = 328,877 \text{ ft}^3 * 0.00000513$
 $\text{HCl at 100\% concentration} = 1.687 \text{ ft}^3 \text{ HCl}$

HCl Mass based on 2,460,000 gallon transfer flow over one year
 $\text{HCl Mass} = 1.687 \text{ ft}^3 * (36.5 \text{ lb HCl/ lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.171 \text{ lbs HCl to air per year from spent scrubber and process water (wash down)}$

Tank truck loading and railcar loading:

Using the same parameters and assumptions as the ferric storage tanks above

The plant is planned to produce a maximum of 20,000 dry tons of ferric chloride or about 8,500,000 million gallons of throughput that will either be loaded into trucks or railcars.

$8,500,000 \text{ gal} / 7.48 \text{ gallons/ft}^3 = 1,136,364 \text{ ft}^3 \text{ displaced air}$
 $\text{HCl at 100\% concentration} = 1,136,364 \text{ ft}^3 * 0.00000634$
 $\text{HCl at 100\% concentration} = 7.204 \text{ ft}^3 \text{ HCl}$
HCl Mass based on 8,500,000 gallon transfer flow over one year
 $\text{HCl Mass} = 7.204 \text{ ft}^3 * (36.5 \text{ lb HCl/ lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.732 \text{ lbs HCl to air per year}$ This volume could be spilt at any ratio between trucks and railcars.

$\text{ft}^3 \text{ for loading at 300 gpm} = 300 \text{ gpm} / 7.48 \text{ gal/ft}^3 * 60 \text{ min/hr}$
 $= 2406 \text{ ft}^3/\text{hr}$
 $\text{HCl 100\%} = 2406 * 0.00000634$
 $= 0.01525 \text{ ft}^3 \text{ HCl per hr}$
 $\text{HCl Mass} = 0.01525 * (36.5 \text{ lb HCl/ lb-mol HCl}) / (359 \text{ ft}^3 / \text{lb-mol})$
 $\text{HCl Mass} = 0.00155 \text{ lbs HCl per hr while transferring}$